Kinetics of absorption of oxygen into aqueous sodium sulfite: order in oxygen.

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Abstract

The reaction order with respect to O2 was studied in absorption with reaction by a Na2SO3 soln. with a Co catalyst (CoCl2, 0.5-3 × 10-3 kmol/m3) at 298 and 313°, total pressure 1-30 atm, O2 partial pressure 0.14-4.2 atm, initial sulfite concn. 0.8 kmol/m3, and pH 8.5 in a 300-cm3 stirred cell with a horizontal liq. surface. The reaction is 2nd order at the O2 partial pressure 0.2 atm and 1st order when it is substantially >0.2 atm. The dependence on the O2 partial pressure decreases rapidly when the O2 partial pressure is increased further. The oxidn. reaction behaves as zero order with respect to sulfite and 1st order with respect to Co under conditions that are relevant to interfacial-area detn. Care must be used in connection with the reaction order in using the air-SO3---Co++ system in interfacial-area detn. under pressure.